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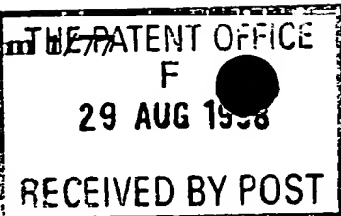
Andrew Gersey

Dated

12th March 1999

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Steribottle Ltd  
St Paul's House  
8-12 Warwick Lane  
London EC4P 4BN

Patents ADP number (if you know it)

If the applicant is a corporate body, give the  
country/state of its incorporation

7504665001

4. Title of the invention

Feed bottles for babies

5. Name of your agent (if you have one)

"Address for service" in the United Kingdom  
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K B Weatherald  
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17 Lonsdowne Road  
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# Feed bottles for babies

This invention relates to feed bottles for babies, and in particular to such bottles as are made from a sterilisable plastics material, as by a blow- or injection-moulding process.

Feed bottles for babies generally comprise a container for the milk or other nutrient liquid (feed); a (natural or synthetic) rubber teat for the mouth of the container, and a screw-threaded cap to fit on the mouth to retain the teat in position. To ensure that a baby's feed is not contaminated, it is usual to sterilise the bottle before use, as by cleaning the bottle in a sterilising liquid. The same needs to be done with the teat and the cap of the bottle, to ensure their sterility. However, sterilisation, or even thorough cleaning of a baby's bottle, may be overlooked, or carried out inadequately, causing the feed to become contaminated.

The present invention aims at avoiding this risk by providing disposable sterile bottles intended for a single-use only.

Accordingly the present invention provides feed bottles for babies, which bottles are as claimed in the appended claims.

The present invention will now be described by way of example with reference to the accompanying drawings, in which:

Figure 1 is an exploded side elevation of an earlier form of disposable feed bottle;

Figure 2a is a view, part in section and part in elevation, of the bottle shown in Fig. 1;

Figure 2b is a view, part in section, along the plane IIb-IIb of Fig. 2a;

Figure 3 is a side elevation, part in section, of one embodiment of this invention,

drawn to a larger scale than Figs. 1 and 2;

Figure 4 is a view, similar to Fig. 3, of another embodiment of the invention;

Figure 5 is another view, similar to Fig. 3, of another embodiment;

Figure 6 is a similar view of another embodiment;

Figure 7 is a similar view of another embodiment;

Figure 8 is a diagrammatic perspective view of a teat for use with the embodiment of Fig. 7;

Figures 9-18 are views, similar to Figs. 3-7, of other embodiments of the invention;

Figure 19 is a diagrammatic perspective view of the upper part of another embodiment of the invention;

Figure 20 is a plan view of the bottle shown in Fig. 19, part in section, showing its internal construction;

Figures 21-23 are views of other embodiments of the invention, similar to Fig. 3, etc.;

Figure 24 is a side elevation, part in section, of another embodiment of the invention, and

Figure 25 is a view, similar to Fig. 24, of an alternative form of that embodiment.

In the following description of the drawings, components which are similar in different Figs. retain their original references.



The bottle shown in Figs. 1 and 2 is the subject-matter of GB patent application 98 03620.5 (patent No.     ). It comprises basically a body 2 acting as the container of the liquid feed. At its upper end (as viewed), the mouth 4 of the body is formed with screw-threads 6 and with a projecting annulus of teeth 8. Intended to coöperate with the threads 6 is a screw cap 10 having its inner surfaces formed with complementary screw-threads 12 and with an annular series of teeth 14, to be described in more detail below. Intended to be clamped between the cap and the body is a retainer disc 16 having a hollow stub 18 projecting from it. A teat 20 for the bottle has an end flange 22. The inner diameter of the opening in the teat is an elastic fit on the stub 18. From Fig. 2a it can be seen that the outer surface of the disc 16 is dished and has an annular flange 24 projecting from it. Designed to clip over a shoulder 26 on the cap 10 is a teat shield 26.

Fig. 2b shows the two annular series of interengaging teeth on the body 2 and the cap 10. As can be seen from it, both series of teeth 28 are in the form of ratchet teeth, with each tooth having a radial face and an oblique face. The angle of obliquity is determined by the nature of the material from which both the cap and body are made. As can be seen from Fig. 2a, the cap 10 has at its centre an opening which is a close fit on the outer part of the teat, adjacent the flange 22.

In order to arrive at the assembled bottle shown in Fig. 2a, the teat 20 is first pushed into place on disc 16. Thereafter the disc and teat are positioned in the mouth 4, with the disc being seated on the mouth rim. The cap is then screwed on to the body 2. During the first part of this movement, the teeth on the cap do not touch the threads 6. Towards the end of the screwing action, the teeth on the cap and body come into contact with each other, and their oblique faces slide on each other, such movement being permitted by the elastic nature of the materials of which the cap and body are made. This 'double ratchet' construction ensures that, while the cap may move relatively to the body in the screwing-on direction, it is impossible for the cap to be unscrewed from the body, so that, once assembled (which happens after the feed has been put in the bottle), the bottle cannot be separated into its component parts. This

ensures that the bottle cannot be re-used as a feed bottle, so that it is a 'one-time use' or 'disposable' bottle.

It is a feature of this invention that all the components of the bottle are made of plastics materials which are sterile as manufactured, or rendered sterile prior to sale, so that the user need do nothing but ensure that the feed is sterile before putting it in the bottle and closing it by means of the cap. Amongst the materials which can be used are polypropylene and polyethylene. After manufacture and assembly (in those versions which comprise separate components, not necessarily of the same plastics material) the bottle, if it is not sterile as made, may be rendered sterile by means of irradiating it with ultra-violet or infrared radiation, with X-rays, gamma rays or an electron beam.

In all embodiments of the present invention, the need for a retainer disc is eliminated. In that form of the invention shown in Fig. 3, the teat 20 is held irremovably on the cap 10 by means of a retainer ring 30. The ring is shaped so that it is able to clamp the flange 22 of the teat between itself and the cap, which is formed with an inwardly-directed annular flange 32. This ensures that the flange 22 of the teat is folded into an 'S-shape'.

In that form of the invention shown in Fig. 4, the ring 30 is of different shape. Its axially-directed cylindrical part 42 is formed at its free end with an outer lip or bead 44. The spacing of this lip from the radial flange 46 of the ring is related to the thickness of the flange 22 of the teat so that, when the ring has been pushed into the mouth of the teat, the lip forces the material of the teat to deform slightly so that the teat embraces the rim of the opening in the cap 10. In this and in many other embodiments of this invention described below, the cap and container have the coöperating sets of ratchet teeth to ensure that, once tightened, the cap cannot be removed from the container by unscrewing, although these teeth are not clearly shown in the drawings, for clarity.

In the Fig. 5 embodiment, the cap 10 is formed with two stepped flanges 46 and 48.

The outer cylindrical surface of flange 46 is formed with screw-threads 50. Intended to engage the threads 50 is a lock ring 52, having an inwardly-directed flange 54 and a complementary set of internal screw-threads. When the lock ring is screwed into position on flange 46, it clamps flange 22 of teat 20 between itself and the shoulder of the cap between the two flanges. Although not shown in the detail, the ring 52 is movable relatively to the screw-threads 50 in only the tightening direction, so that it too is not removable from its clamping engagement on the teat.

In the Fig. 6 version, the flange 22 of the teat is of greater diameter than the mouth of the body. The inner surface of the cap 10 is formed with an annular recess 56 adjacent to the screw-threaded portion thereof. When the cap is screwed on to the body 2, the outer part of the flange 22 is clamped between the walls of the recess 56 and the rim of the mouth of the body 2.

In the Fig. 7 version, the teat 20 is secured directly to the cap 10. The flange 58 of the cap is formed with at least two inwardly- and axially-directed retainers 60 of 'mushroom' shape. As shown in Fig. 8, the flange 22 of the teat is formed with two openings 62. Preferably the inner diameter of the openings 62 is slightly less than the diameter of the 'stalks' of the retainers 60. The heads of the retainers are sloped or otherwise shaped to facilitate their being pushed into the openings 62 in the teat. When the retainers are fully in place, the walls of the openings 62 are a fluid-tight grip on the stalks, and the heads of the retainers rest against the inner face of the flange 22. There are as many retainers on the cap as are needed to ensure that the contact between the cap and the teat is fluid-tight over the whole area of the flange, to prevent milk etc. from seeping out from between the cap and the teat in use.

In each of those versions of the invention shown in Figs. 9-12, the flange 22 of the teat 20 is convoluted and engages the cap in a fluid-tight manner without the use of auxiliary members, by virtue of its inherent elasticity. The length of its cylindrical flange as formed, prior to its being folded about the cylindrical flange 23 of the cap,

ensures that the teat grips the flange 23 too tightly to be dislodged by pulling on the exposed part of the teat.

In the Fig. 13 version, the flange 22 of the teat 20 is sealed to the inner surface of the flange 58 of the cap in a fluid-tight manner. One particular method is to weld the two contacting surfaces together by the application of ultrasonic vibrations or like methods of welding plastics surfaces together.

Fig. 14 is similar to Fig. 13, the only significant difference being the presence of an integral inner collar 62 projecting from the flange 58. The outer diameter of the collar is related to the inner diameter of the mouth of the body 2 so that the collar is an air-tight fit on the inner surface of the end of the body in the assembled condition. This fit relieves the mating screw-threads 6 and 12 of the need to be a fluid-tight fit.

In the Figs. 15 and 16 versions, the Fig. 13 version is modified by providing the outer surface of the body, adjacent the ends of its screw-threaded portion 6, with an external shoulder 64. In the Fig. 15 version, the shoulder is prominent, with its maximum outer diameter being the same as the outer diameter of the cap 10, so that the two components are a flush fit when assembled together. In the Fig. 16 version, the cross-sectional shape of the shoulder is that of a wedge, so that the outer surface of the body blends smoothly into the outer surface of the cap.

In all the above embodiments of this invention, the lid is stated as having to be screwed on to the body of the bottle by the user after the liquid feed has been put in the body. As an alternative to this, the cooperating screw-threads may be made of such a plastics material, and to have a cross-sectional shape, that permits the cap to be pushed on to the mouth of the body, and only finally tightened by screwing. The shape of the interlocking ratchet teeth may also be modified to facilitate their coming into engagement with each other by relative axial movement.

In the embodiments shown in Figs. 17 and 18, the caps are intended to be placed on

the bodies solely by such axial movement, and without any screwing action being necessary. In the Fig. 17 version, the cap is formed with two axially-spaced annular recesses 66, while the body has two complementary peripheral teeth 68. Both the recesses and the teeth are of saw-tooth cross-section, appropriately oriented so that the inclined surfaces of the teeth slide over the inclined surfaces of the recesses as the cap is pushed into place. Once fully in place, the contacting planar faces of the teeth and recesses prevent the cap from being removed from the body, thus ensuring that the bottle is able to be used only once before being disposed of. It will be appreciated that the internal collar 70 projecting from the flange 58 of the cap is optional.

In the Fig. 18 version, there is only a single tooth 72 on the cap intended to cooperate with a recess 74 on the downwards face of a triangular-sectioned buttress 76 formed on the external surface of the body at a location spaced from its mouth. The cap and body are dimensioned as shown to permit an oversized flange 22 of the teat 20 to become clamped between the cap and the rim of the mouth of the body as the cap is pushed into position.

The bottle shown in Figs. 19 and 20 as sold has its cap 100 loosely fitted on the spade lugs 102 projecting outwardly from the mouth of the body 2 of the bottle. When the bottle is to be filled, the cap is removed by unscrewing it in the clockwise direction as viewed from the top of the cap, as shown by the arrow 104. After the bottle has been filled with the feed, the cap is placed in position and rotated anti-clockwise. Ramps on the cap come into contact with the underside of the spade lugs, so that rotation forces the cap into sealing engagement with the mouth of the bottle 2. As the rotation continues, the ramps slide under and beyond the lugs, and resile into an abutting engagement with the side faces of the lugs, which prevents the cap from being movable in the 'unscrewing' direction, so that it becomes irremovable from the body 2.

In the Fig. 21 version, the cap 10 is welded to the flange 22 of the teat 20, and the

flange 22 is also designed to become clamped between the cap and the body. The cap is formed with a flat-topped dome 80 having a frusto-conical shoulder 82. The detachable shield 26 has its open end flared to form a type of bell mouth. The angle of the opening is related to the angle of the shoulder 82, and to the resilience of the shield so that, when the shield is pushed into its shielding position, its open end is forced outwardly to grip the shoulder sufficiently tightly to resist accidental forces tending to dislodge it. In this embodiment, the teat 20 and cap 10 are welded together over most of their common area. In addition, the border of flange 22 is clamped between the cap and the mouth of the container.

Fig. 22 shows an alternative method of securing the shield 26 to the cap 10. In this embodiment, the shield is formed with a cylindrical rim 84. After it has been put in place on the cap, the outer border of the rim is secured permanently to the cap, as by a heat weld or an adhesive. Spaced inwardly of this border, the body of the rim is formed with perforations or other lines of weakening to form a peripheral strip 86. At one end of this strip there is a projecting tab 88. When the bottle is to be used, the tab is gripped in known fashion and pulled to separate the strip from the rest of the rim 84 by tearing it along the lines of weakness. This detaches the major part of the shield from the border, enabling it to be removed easily from the cap, to expose the teat 20.

In the Fig. 23 version, the shield 26 has a rim 84 intended to fit over the end of the cap, the rim having an extension 90 which is secured in any suitable fashion to the curved surface of the cap. When the bottle is to be used, the extension functions as a hinge, enabling the rest of the shield to be pivoted about the extension to expose the teat. If desired, the extension may also have a line of weakness across it, so that the shield may be torn from the end of the extension.

In contrast to all the previous embodiments of this invention, in the versions shown in Figs. 24 and 25, the cap is not used to hold the teat, but is used merely to close the mouth of the body of the bottle. In these versions, the mouth is formed with a beaded

edge 92. The cap 94 has in its edge flange 96 an annular recess 98 of cross-section complementary with that of the bead 92. One or other of the two annular walls of recess 98 is intended to have a line of weakness around its base. In contrast with the other versions of the invention, while the cap 94 is able to be removed fairly easily from the beaded edge, the act of doing so applies such force to the respective wall that it breaks along its line of weakness and becomes detached from the rest of the cap. This ensures that, while the cap may be removed, it cannot be replaced, thus preventing the bottle from being re-used as a baby bottle. In the Fig. 25 version, the cap 94 is moulded in one piece with the rest of the container which, in this version, has the teat 20 also moulded in one piece with the body. The mouth of the opening in the body is slightly flared outwardly, and the cap is formed with an inwardly-directed lip 100. This lip has a line of weakness at its root so that it too becomes separated from the rest of the cap when force is applied to remove the cap from its grip on the flared mouth of the body.

In all versions of the bottle, the plastics material forming the body of the container may be transparent or translucent, and graduation marks may be moulded or otherwise formed in its walls to act as a guide to the volume of feed in the bottle.

Accordingly it will be seen that this invention provides disposable baby feed bottles made of sterile or sterilisable plastics material, which are inherently of inexpensive construction, particularly when made in large numbers.

## Claims

- 1 A disposable feed bottle of which all the components are made of sterile or sterilisable plastics materials, the bottle including: a container for milk or other liquid, the container having a mouth intended to be sealed in a fluid-tight manner by means of a cap, the cap being either non-removable from the container when in its sealing position, or not being able to reächieve a fluid-tight fit therewith after it has once been removed therefrom.
- 2 A disposable feed bottle of which all the components are made of sterile or sterilisable plastics materials, the bottle including: a container for milk or other liquid, the container having a mouth intended to be placed in communication with the interior of a teat; a cap for retaining a teat in position over the mouth of the container, and a teat intended to be secured to the cap and/or to the container in a fluid-tight manner, the cap being movable relatively to the mouth into a position in which the teat is secured to the container in a fluid-tight manner, the cap thereafter being non-removable from the container.
- 3 A bottle as claimed in claim 2, in which the teat is mounted on a retainer disc which in turn is adapted to be secured to the neck of the container by the cap.
- 4 A bottle as claimed in claim 3, in which the teat is formed with an annular planar flange adapted to be clamped between the cap and the disc.
- 5 A bottle as claimed in claim 3 or 4, in which the disc has an integral central stub cylinder which projects into the interior of the teat.
- 6 A bottle as claimed in any of claims 2-5, in which the cap and the neck are formed with complementary screw-threads.



7 A bottle as claimed in claim 6, in which the cap has a ratchet formation on its inner surface, and in which the neck has one or more outwardly-directed lugs intended to engage the ratchet formation in such a manner as to permit rotation of the cap relatively to the neck in only one angular direction.

8 A bottle as claimed in any preceding claim, in which the container is made of polypropylene, and has been formed by an injection- or blow-moulding operation.

9 A bottle as claimed in any preceding claim, in which the cap, or cap and disc, is or are made of high-density polyethylene by an injection-moulding operation.

10 A bottle as claimed in any of claims 2-9, in which the shield has a frusto-conical part of which the wider end forms a shoulder which is a push fit on the peripheral corner of the cap.

11 A bottle as claimed in claim 10, in which the shield has at its wider end a series of inwards projections intended to engage a complementary recess in the cap.

12 A bottle as claimed in any preceding claim, in which the body of the container is made of transparent or translucent material, and carries a series of graduation markings enabling the volume of liquid in the container to be ascertained visually by inspection.

## Abstract

A feed bottle for babies is made of sterilisable plastics material. In its basic form, the bottle has a mouth intended to be sealed with a cap put in place after the feed has been put in the bottle through its mouth. The bottle is rendered unfit for re-use as a baby's bottle, thus making it 'disposable', either by preventing the cap from being able to be removed from the body of the bottle, or by preventing it from being replaced in a fluid-tight position once it has been removed.

Preferably the cap has a teat of synthetic rubber secured to it, either directly or by the teat's being clamped between the cap and the mouth of the body, so that the teat too is non-removable from the bottle.

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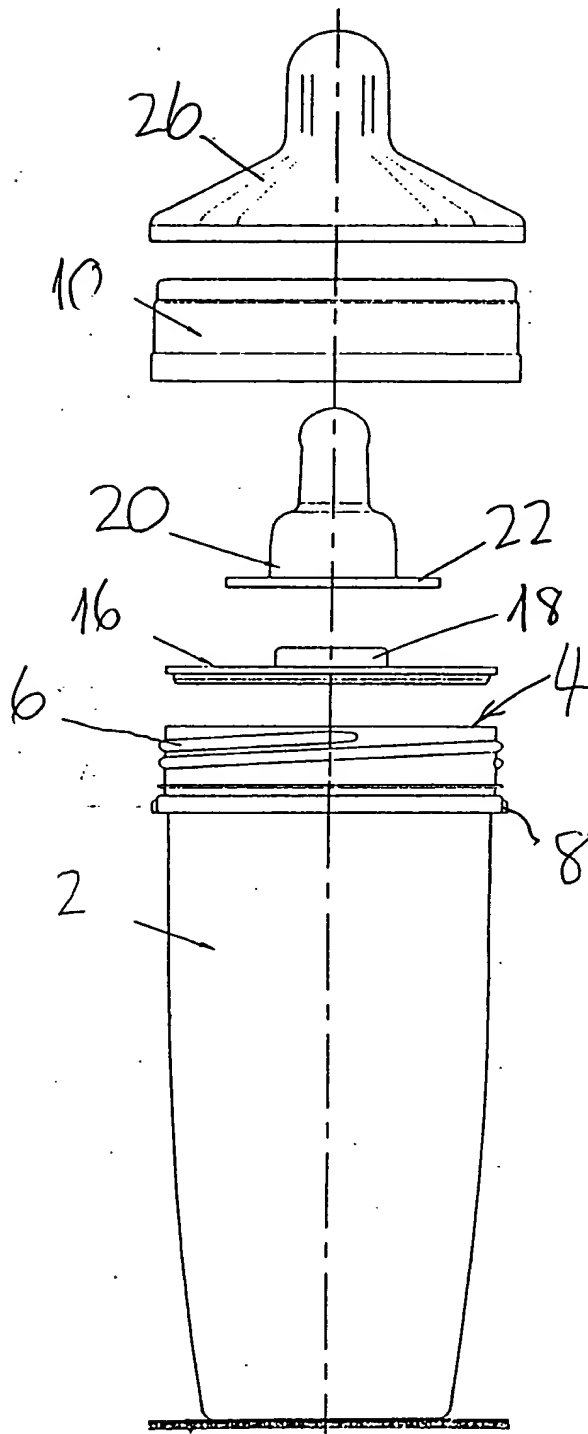


Fig 1

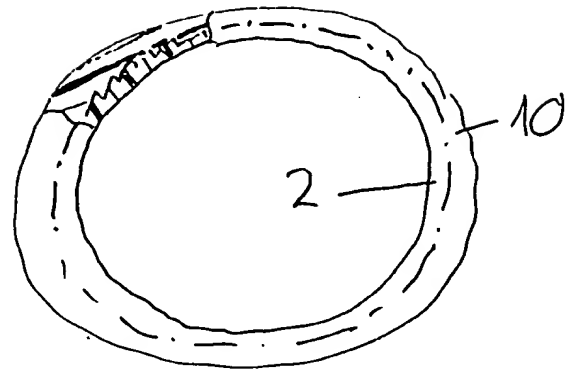


Fig 2b

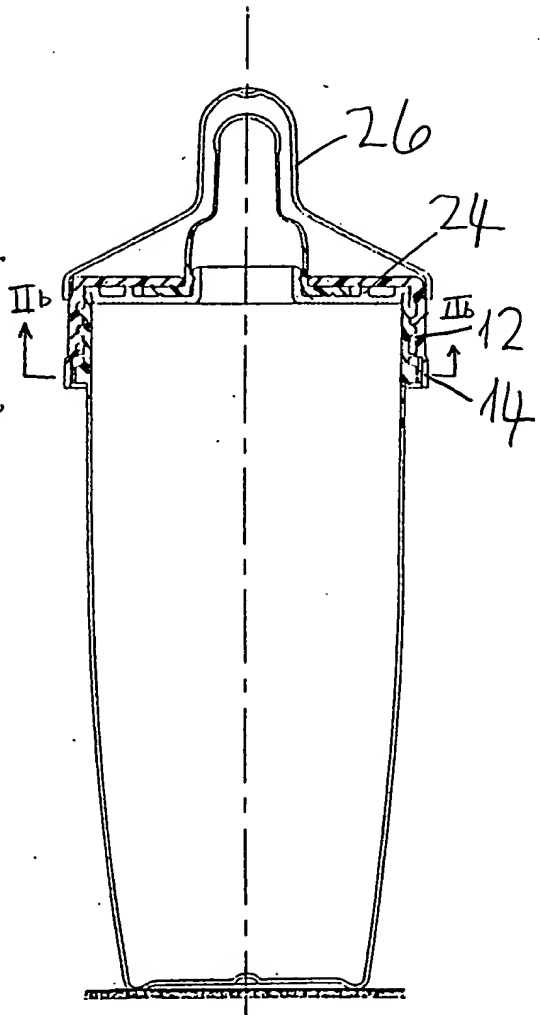


Fig 2a

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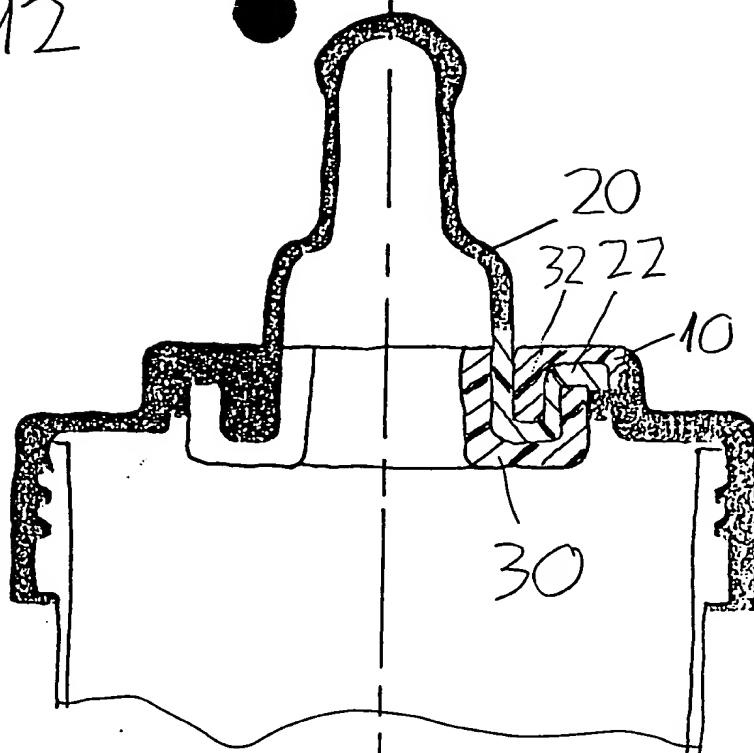


Fig 3

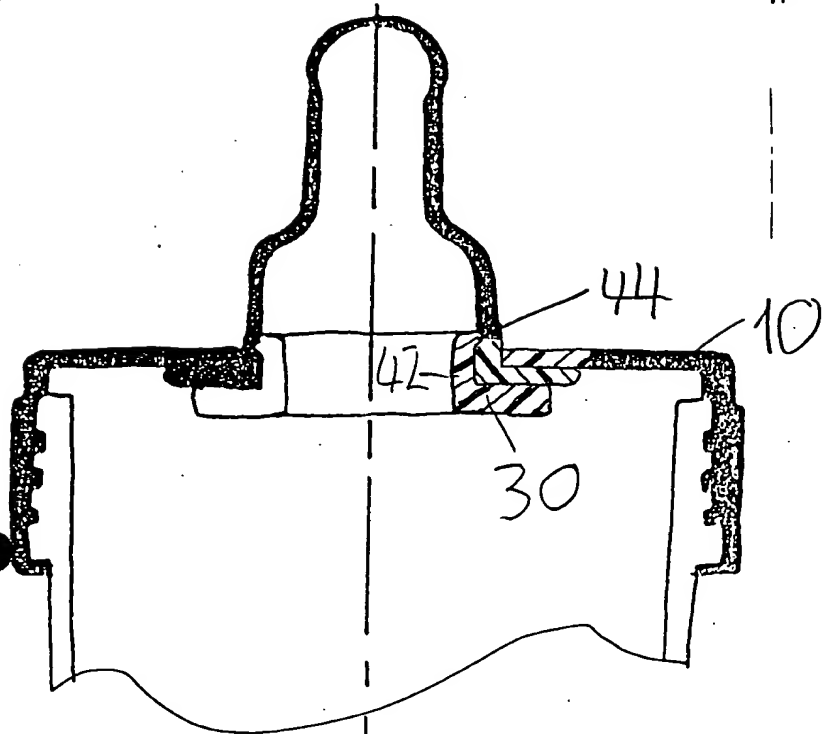


Fig 4

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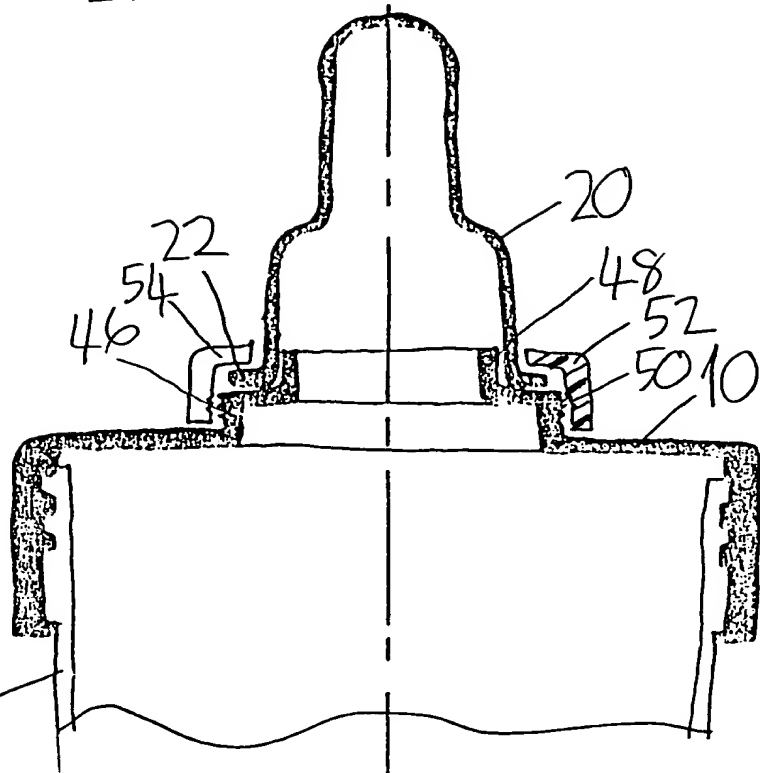


Fig 5

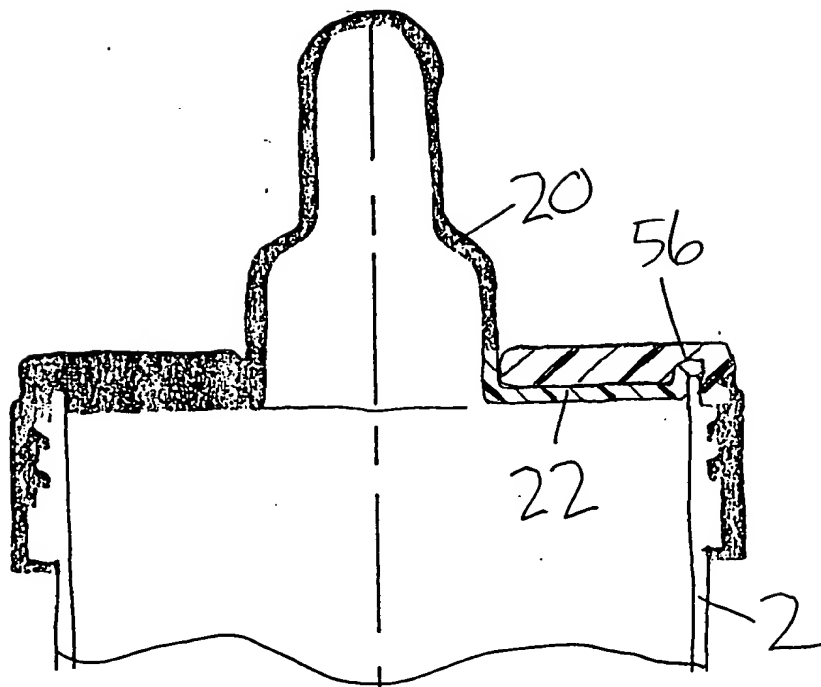


Fig 6

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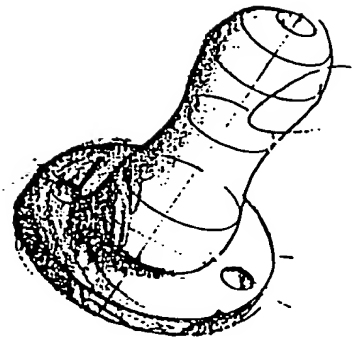
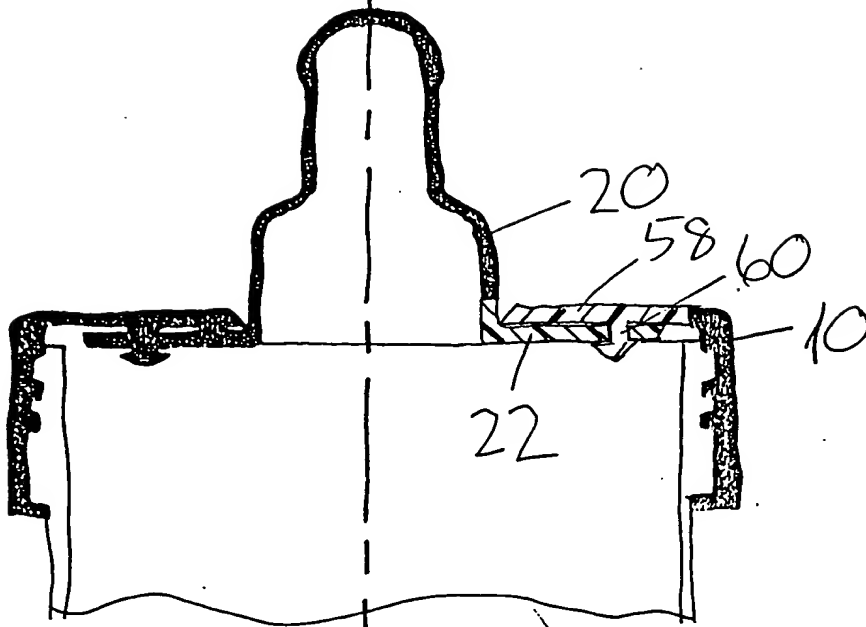


Fig 8

Fig 7

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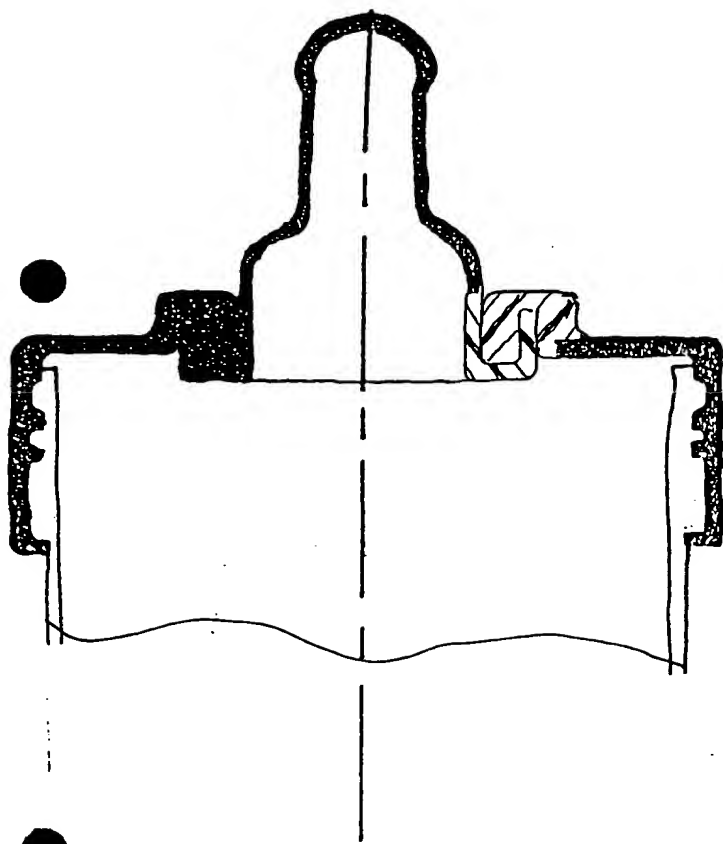


Fig 9

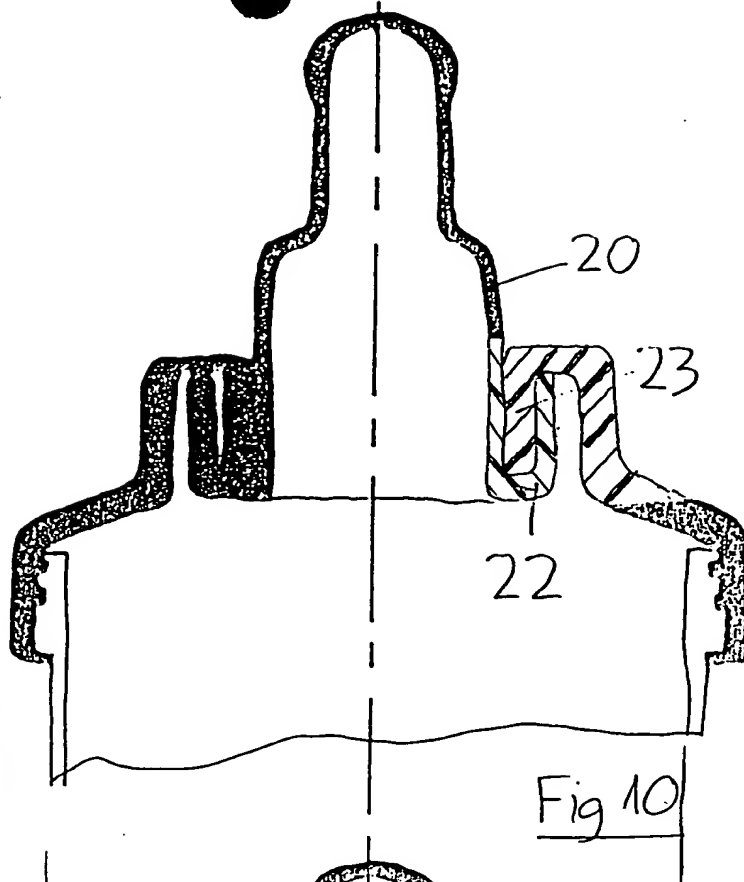


Fig 10

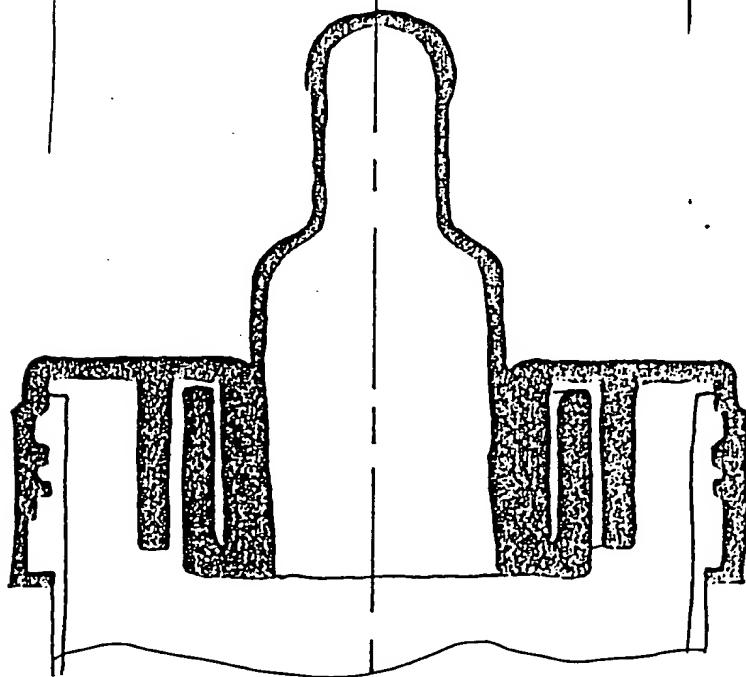


Fig 11

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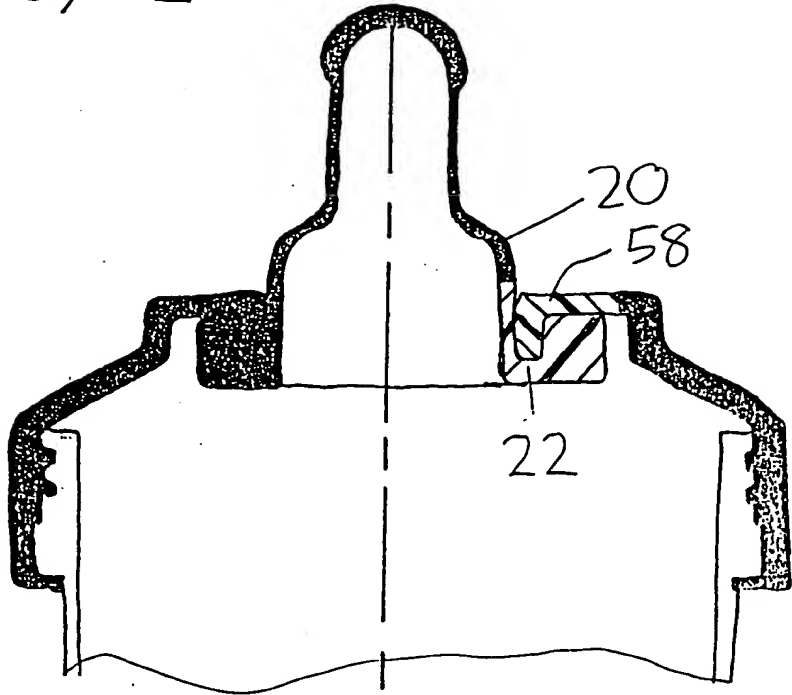


Fig 12

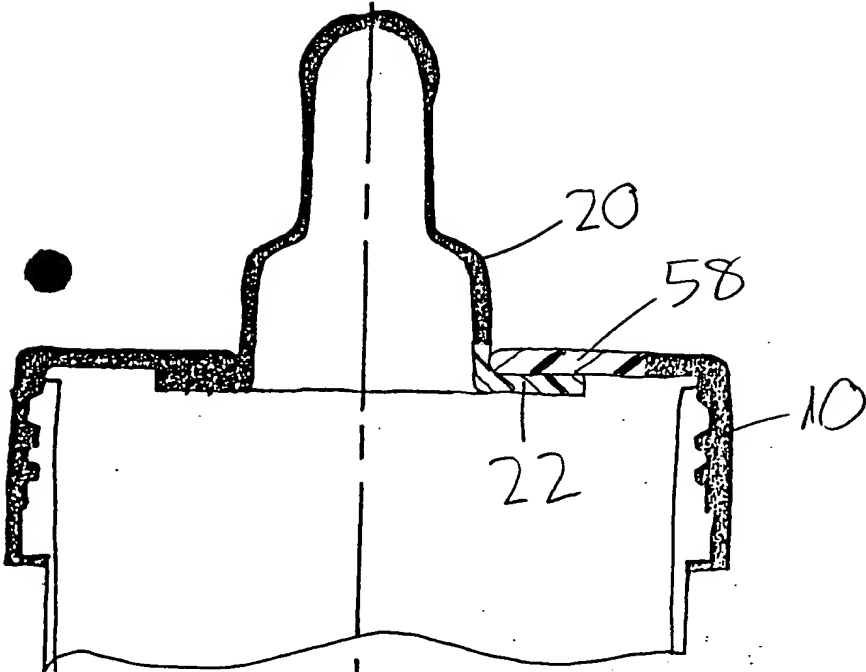


Fig 13

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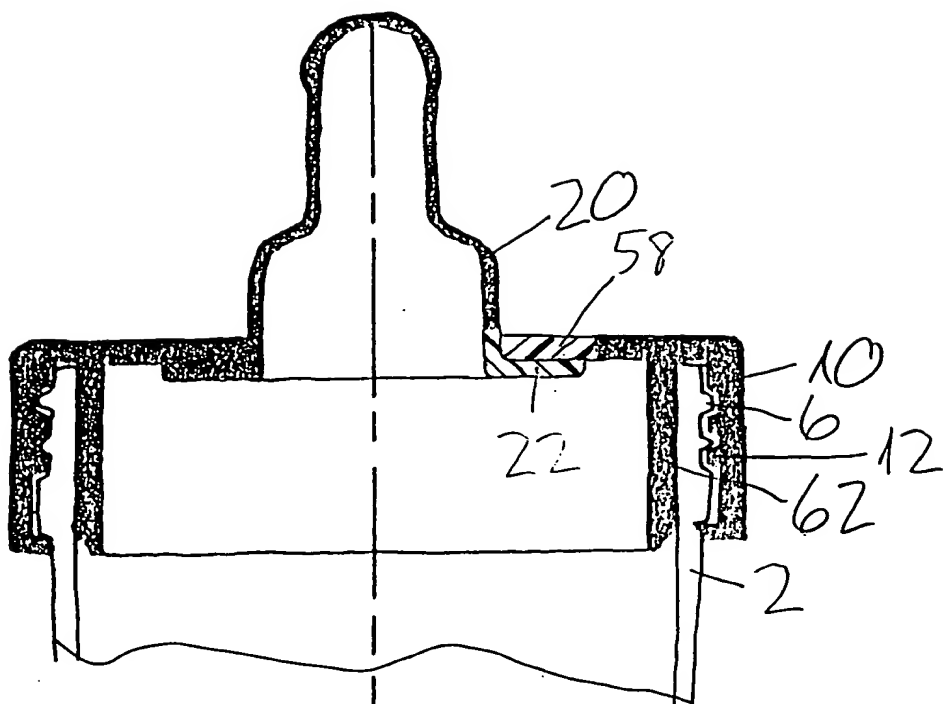


Fig 14

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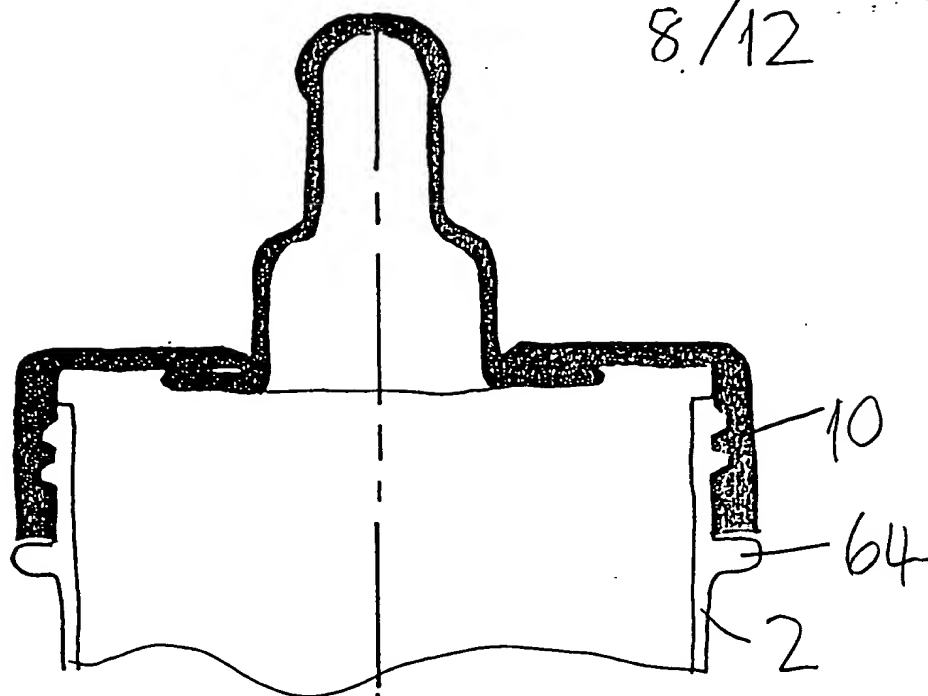


Fig 15

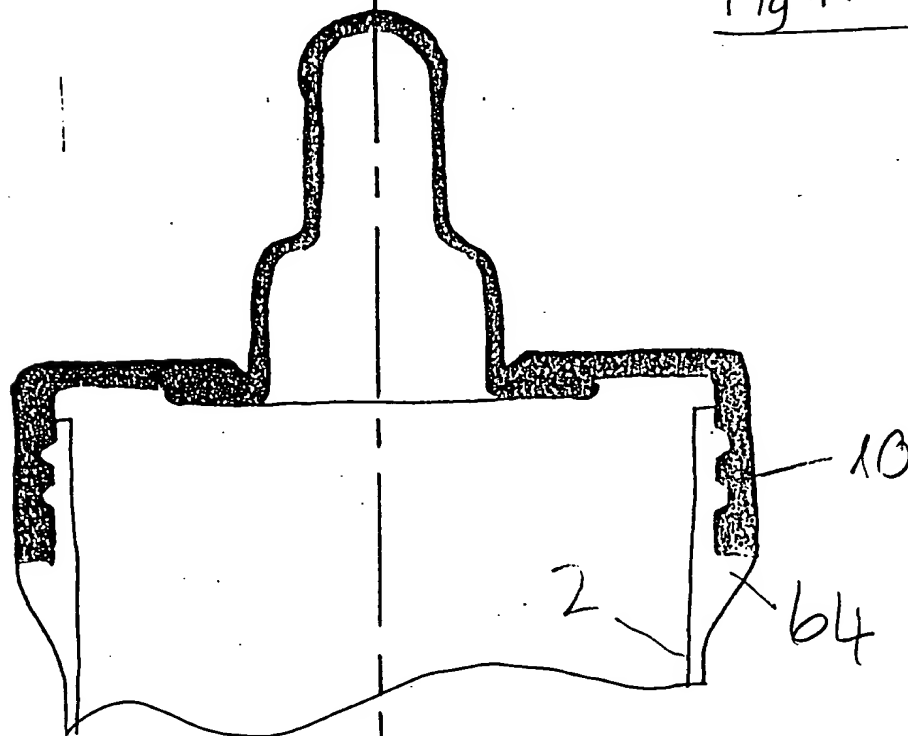


Fig 16

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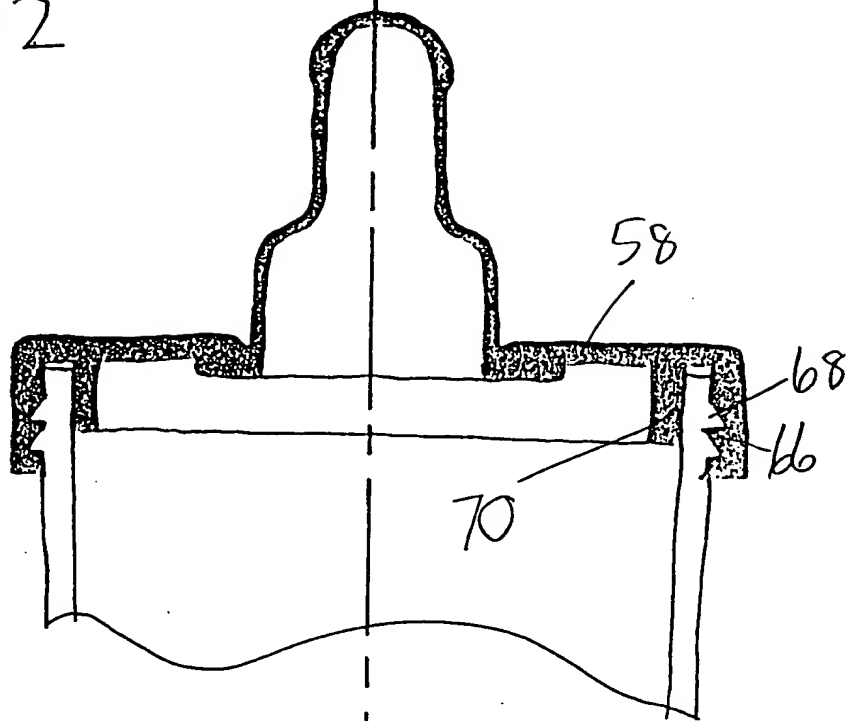


Fig 17

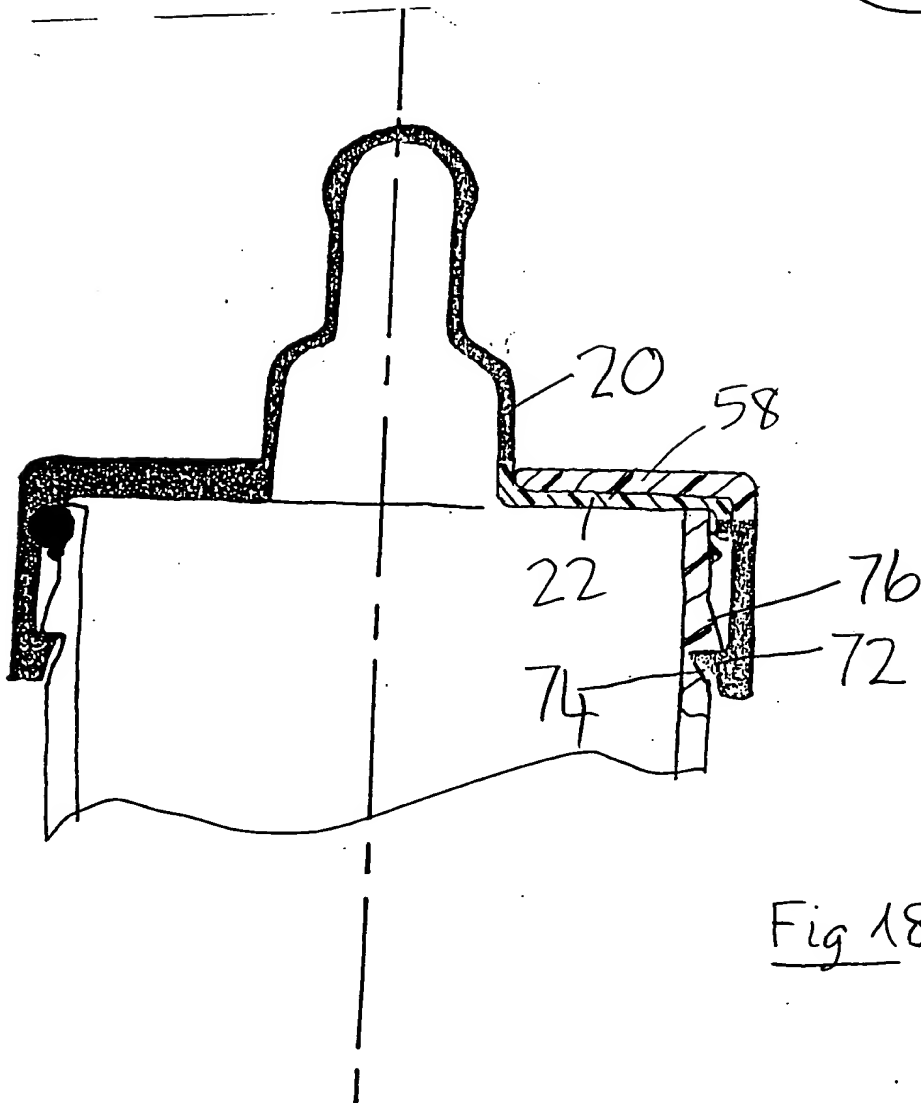
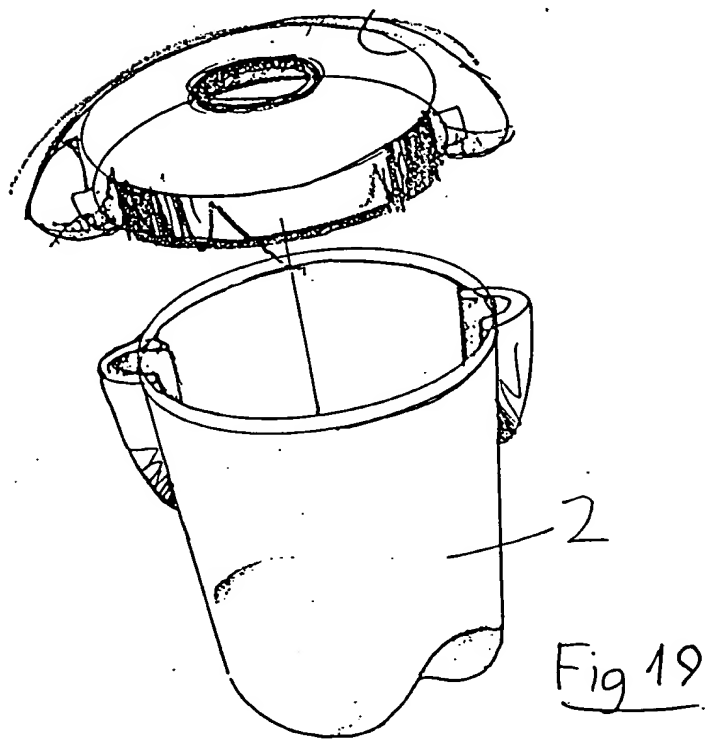
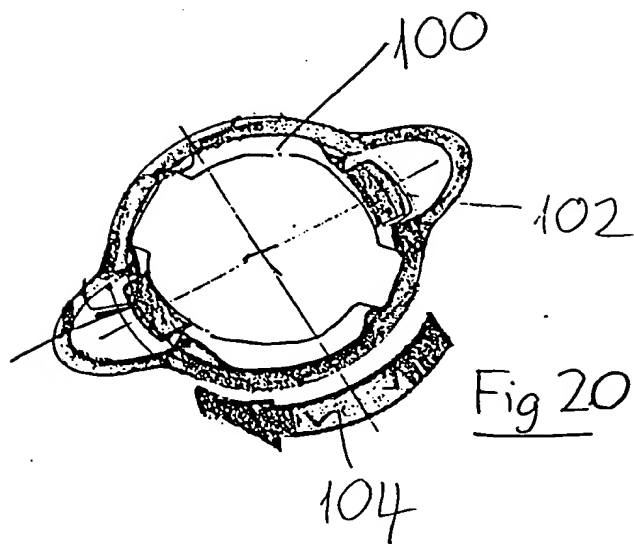


Fig 18

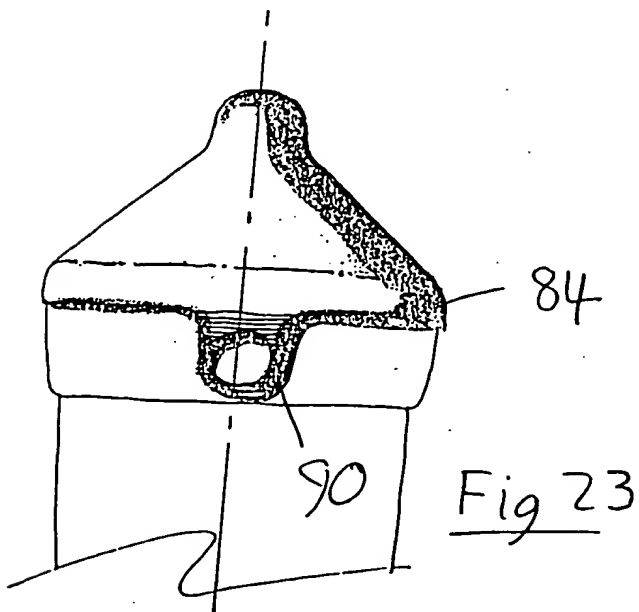
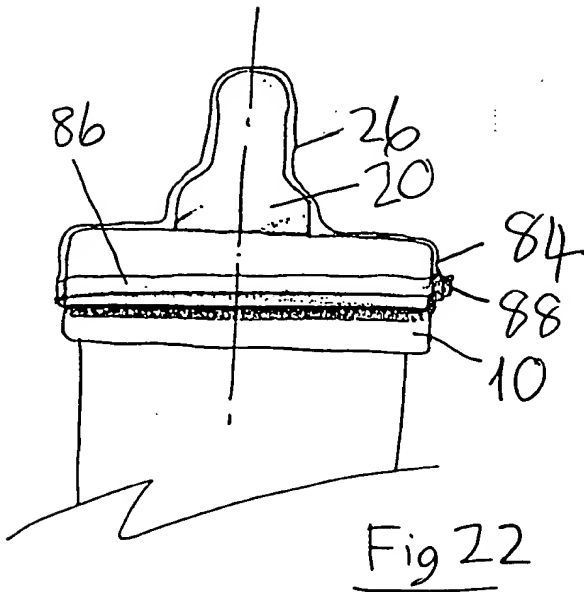
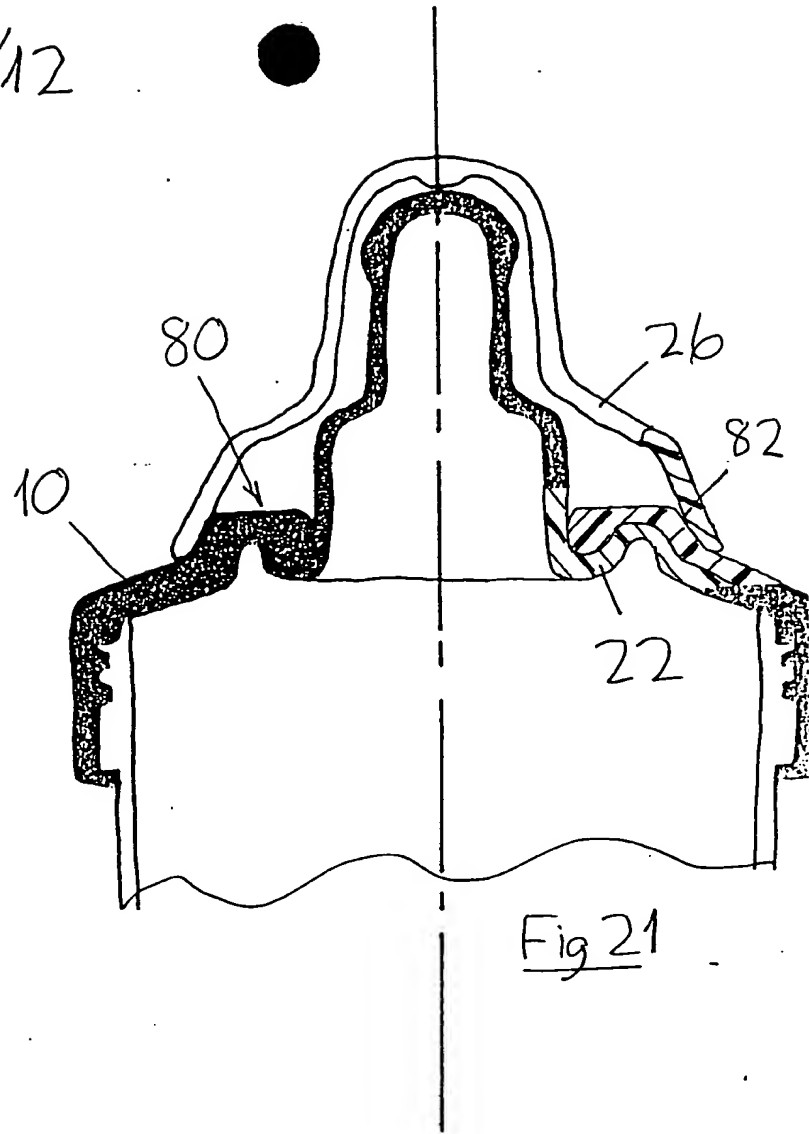
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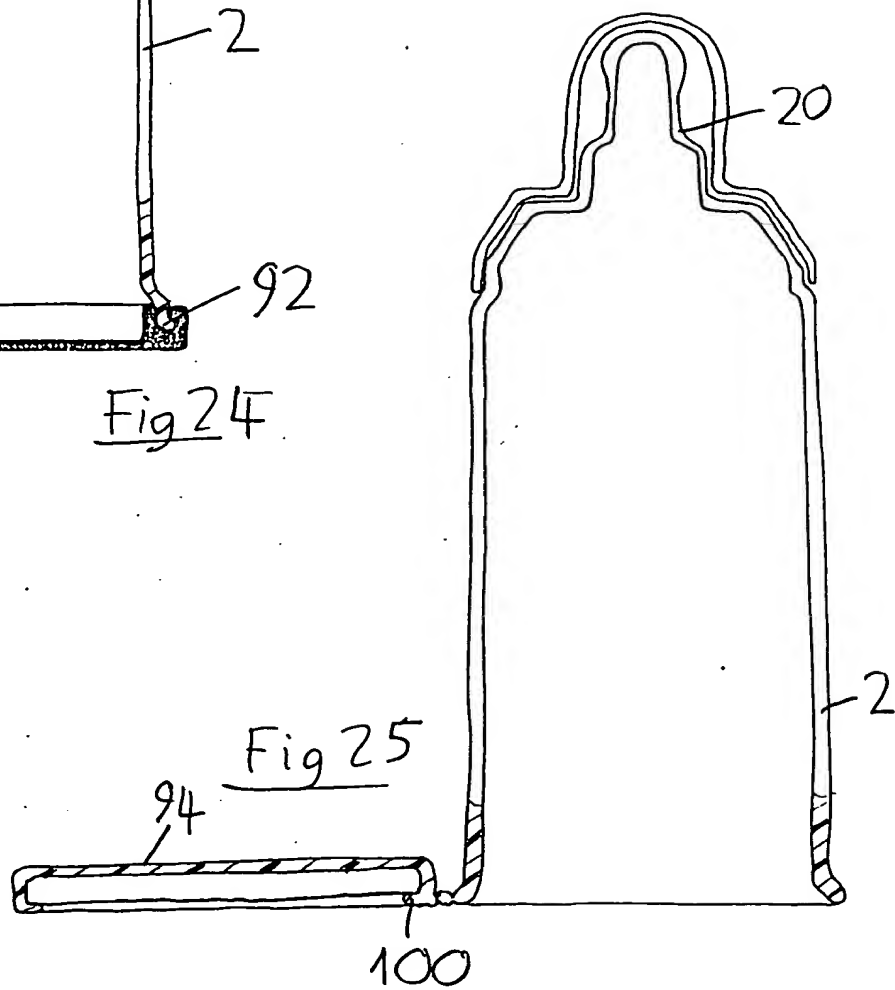
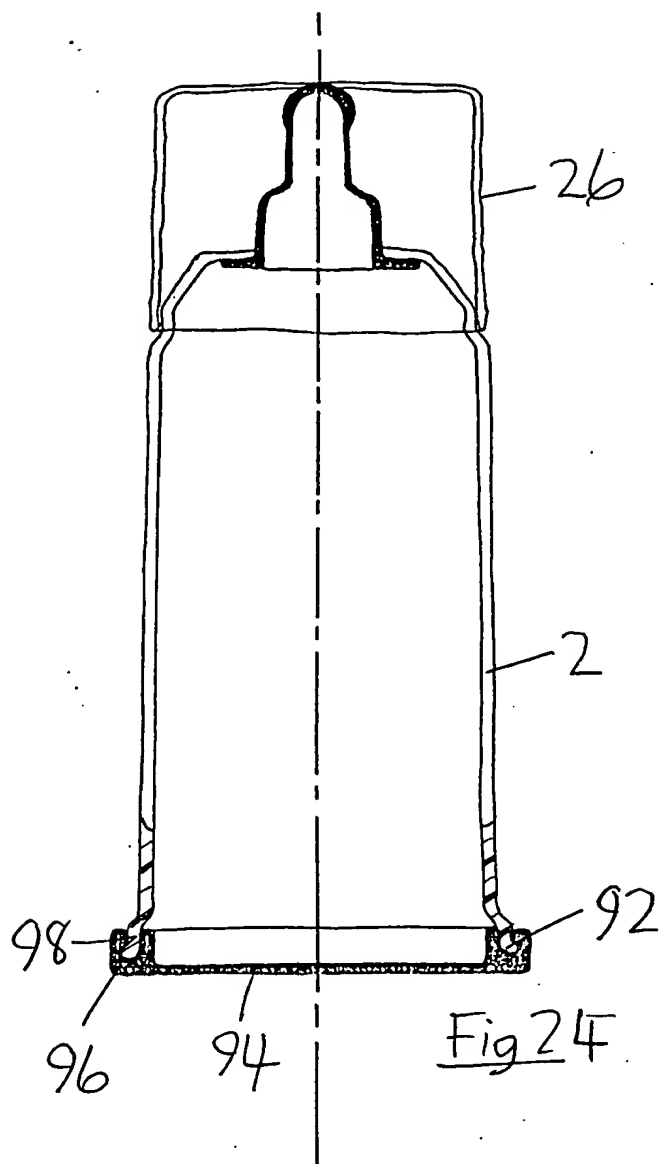
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